

USSN: 10/720,617  
Atty. Docket No.: 2003B125  
Amdt. dated May 2, 2005  
Reply to Office Action of November 30, 2004

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### **REMARKS/ARGUMENTS**

#### ***Status of Claims***

The claims were subject to an election/restriction requirement, and thus, only claims 1 through 21 are under consideration in this application. Claims 22 through 30 have been withdrawn. Claims 9, 10, and 18 have been amended herein to correct minor typographical errors.

#### ***Double Patenting***

Claims 1-5 and 8 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 1, 10-13, and 18-25 of co-pending Application No. 10/720,607. Attached is a responsive Terminal Disclaimer which would overcome an actual rejection should a patent issue on the co-pending application. Withdrawal of the double patenting rejection is respectfully requested.

#### ***35 U.S.C. 103(a) Rejection of Claims 1-16 and 18-21 over Moser et al. '904***

Claims 1-16 and 18-21 were rejected over Moser et al., U.S. Patent 6,514,904 ("Moser") as obvious in view of Moser's disclosure of catalyst with platinum group metal component, indium component, and overlapping ranges of these components with the claimed subject matter. The rejection asserts that known mathematical techniques would easily determine the correct selection of components and portions. Accordingly *In re Malagari* and *In re Wertheim* were cited for a case of prima facie obviousness.

Applicants respectfully traverse the rejection. It is not simple mathematical analysis to obtain the very beneficial catalysts of the present invention. It is beyond the normal investigation, analysis, and deduction of the skilled artisan to pick and choose the appropriate portions of the disclosure of Moser to arrive at the present invention.

#### **Moser**

Moser discloses a shaped catalyst having a specific X-ray diffraction pattern so as to provide good crushing strength and suitable gasoline range catalytic reforming activity.

Moser further discloses the choice of alumina only for the support so as to provide certain

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structural advantages. The alumina is preferably calcined at 700-900 degrees C.

Moser discloses the optional presence of a "platinum group" component defined to include Pt, Pd, Ru, Rh, Ir, and Os at 0.01 to about 2 mass %. Only platinum, iridium, and palladium compounds are mentioned, platinum is "preferred," and any reference to rhodium is merely as part of a laundry list not amounting to a suggestion, let alone a teaching of how to use this element.

Moser discloses the use of Sn alone in an example with spherical particles.

Moser discloses the optional presence of halogen.

Moser discloses the optional presence of Group IVA (IUPAC 14) metals, especially Ge and Sn.

Moser discloses the optional presence of Re, Ga, Ce, La, Eu, In, P, Ni, Fe, W, Mo, Zn, and Cd at about 0.01 to about 5 mass %.

Moser discloses the optional additional presence of alkaline and alkaline earth metals to include Cs, Ru, K, Na, Li, Ca, Sr, Ba, and Mg.

Clearly the support preparation, shape, and X-ray diffraction are the significant teachings of the catalyst of Moser et al.

#### The Present Invention

The present claimed invention clearly specifies a catalyst having less than 3.0 wt. % rhodium and 0.3 to 5.0 wt. % indium so as to be able to achieve the significant reduction in C<sub>4</sub> and C<sub>6</sub> oligomers, "green oil." The inventive catalyst is significant for treating highly unsaturated materials (usually alkynes or diolefins) present as a small percentage of an olefin stream. Accordingly, the conversion of these materials, whether to an alkane such as ethane or to an olfin such as ethylene, is not so significant as *not* making oligomers, which cause other, expensive, processing requirements downstream. The catalysts of the invention are significant in reducing the oligomers from the current industry levels. These attributes--and the particular catalysts to obtain them--are not taught or suggested by the reference.

The skilled artisan would have to go far beyond normal skill level and investigation to obtain the combinations and ranges of the invention as set forth in the claims. It is not mere

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mathematical technique which would lead to the invention. The skilled artisan would have to ignore the shape criteria of Moser and select from a combination of six items in the "platinum group;" thirteen items in the optional group, at least eighteen if you count halogens; nine optional alkaline/alkaline earths; and at least two from Group IVA (IUPAC 14) (Ge and Sn).

This would be  $6 \times 13 = 78$  combinations in the simplest selection to  $6 \times 18 \times 9 \times 2 = 1944$  combinations with all groups -- a staggering task at best without direction or purpose to achieve low green oil.

To the above selected combination, the skilled artisan would then need to select *only* an upper end portion of the indium wt % range; plus an upper end portion for the rhodium wt % range and somehow derive a higher range portion, beyond 2%, as well. At this point the skilled artisan is not guided at all by Moser and in view of this, plus the advantageous attributes of the inventive catalyst, any *prima facie* case of obviousness has been overcome.

Reconsideration and removal of the rejection are respectfully requested.

***35 U.S.C. 103(a) Rejection of Claims 1-15 and 17-21 over Robinson et al. '935***

Claims 1-15 and 17-21 were rejected as obvious over Robinson et al. U.S. Patent 4,522,935 ("Robinson") as obvious in view of Robinson's disclosure of catalyst with platinum group component and indium with a 1.14 ratio of In:Pt. The rejection asserts that although the ranges of components in the catalysts are generally reversed, the skilled artisan would have arrived at the invention, citing *In re Malagari* and *In re Wertheim* for a case of *prima facie* obviousness.

**Robinson**

Robinson discloses a platinum, tin, indium, and halogen supported hydrocarbon reforming catalyst. The "platinum group" disclosure of Robinson is, like Moser, little more than a disclosure to prepare a platinum catalyst for reforming. There is no suggestion of which chemicals to use other than chloroplatinic acid to prepare the catalyst; only platinum is exemplified in four catalysts and a process; and the "group" is called platinum. While palladium, iridium, rhodium, osmium, and ruthenium are given lip service as possible

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components, platinum is cited as preferred and the skilled artisan is given no indication of which chemicals to use to incorporate these elements, how to incorporate them, how much to incorporate, and which of the other components should be selected with them (or not). This is not a teaching or suggestion of the claimed invention and the skilled artisan is not directed to key components useful in the hydrogenation of alkynes and diolefins.

Further, the skilled artisan would have to take a direction opposite from the teaching of Robinson to arrive at the claimed range of components. Like Moser, the Robinson disclosure is merely an agglomeration of lists of materials that do not lead to or suggest the claimed invention. Any prima facie case of obviousness is overcome by the clear teaching of Robinson (and Moser) to use platinum, not rhodium and to use it in the combination and range now claimed.

Prima facie obviousness is overcome by the highly successful green oil reduction accomplished by the selected catalysts/ranges of the invention. It is the necessity of the industrial process for Applicants' catalyst and large scale, long-term work to try many permutations and combinations of materials in a variety of ranges that eventually lead to the claimed invention--hard work, the "99% perspiration." Robinson is not a teaching to the skilled artisan of a rhodium catalyst, especially in the opposite ranges claimed.

Reconsideration and removal of the rejection is respectfully requested.

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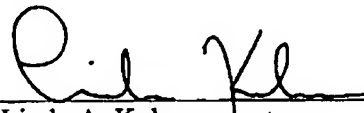
**CONCLUSION**

In view of the submitted Terminal Disclaimer and the Remarks above, withdrawal of the rejections and allowance of the application are respectfully requested.

If it would be of assistance to resolve any outstanding issues in the present application, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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